



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
WASHINGTON, D.C. 20546

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REPLY TO  
ATTN OF: GP

OCT 29 1970

TO: USI/Scientific & Technical Information Division  
Attention: Miss Winnie M. Morgan

FROM: GP/Office of Assistant General Counsel for  
Patent Matters

SUBJECT: Announcement of NASA-Owned U. S. Patents in STAR

In accordance with the procedures agreed upon by Code GP and Code USI, the attached NASA-owned U. S. Patent is being forwarded for abstracting and announcement in NASA STAR.

The following information is provided:

U. S. Patent No. : 3,493,746

Government or  
Corporate Employee : Computer Control Company

Supplementary Corporate  
Source (if applicable) : Jet Propulsion Laboratory

NASA Patent Case No. : XNP-06031

NOTE - If this patent covers an invention made by a corporate employee of a NASA Contractor, the following is applicable:

Yes  No

Pursuant to Section 305(a) of the National Aeronautics and Space Act, the name of the Administrator of NASA appears on the first page of the patent; however, the name of the actual inventor (author) appears at the heading of Column No. 1 of the Specification, following the words ". . . with respect to an invention of . . ."

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Enclosure

Copy of Patent cited above

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FACILITY FORM 602

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N71-15606

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ADMINISTRATOR OF THE NATIONAL AERONAUTICS  
AND SPACE ADMINISTRATION  
SUPPORT STRUCTURE FOR IRRADIATED ELEMENTS  
Filed Oct. 26, 1966

3,493,746

FIG. 1

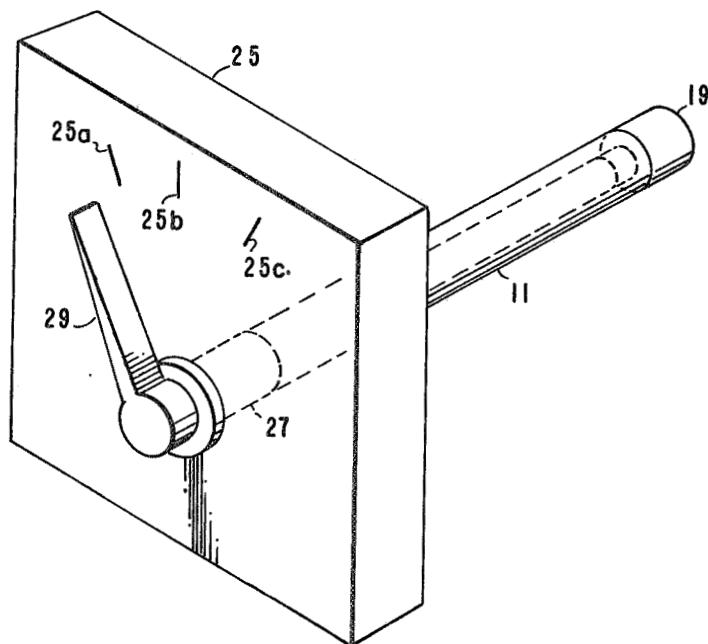
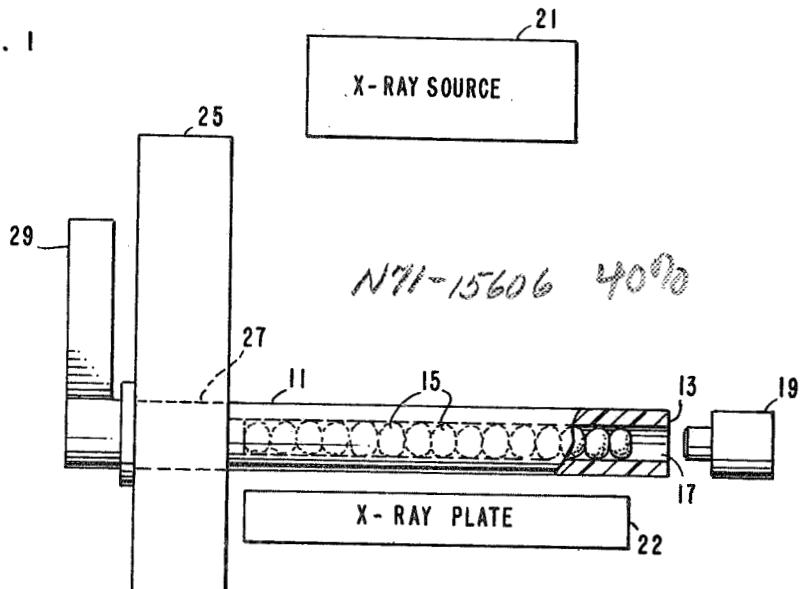


FIG. 2

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3,493,746  
SUPPORT STRUCTURE FOR IRRADIATED ELEMENTS

James E. Webb, Administrator of the National Aeronautics and Space Administration, with respect to an invention by Anthony J. Nasuti, Hyde Park, Mass.  
Filed Oct. 26, 1966, Ser. No. 590,144  
Int. Cl. G01n 23/20; H01j 37/26

U.S. CL. 250—52

7 Claims

## ABSTRACT OF THE DISCLOSURE

A structure for supporting a plurality of small, pellet-sized elements for simultaneous exposure to X-ray radiation. The structure includes a tube, of a material which is permeable to X-ray radiation, in which the elements to be irradiated are located at different axial positions along the tube. The tube, which is disposed in the path of the radiation from an X-ray source towards an X-ray sensitive plate, is manually rotatable about its longitudinal axis, so as to control the orientations of the irradiated elements in the radiation path.

The invention described herein was made in the performance of work under a NASA contract and is subject to the provisions of section 305 of the National Aeronautics and Space Act of 1958, Public Law 85-568 (72 Stat. 435; 42 USC 2457).

This invention relates to an apparatus for supporting irradiated matter and, more particularly, to an improved structure, capable of supporting a plurality of miniature elements exposable to radiation such as an X-ray beam.

Although various structures have been developed to support relatively large objects which may be subjected to radiation, prior art devices are not designed to support a plurality of miniature or small elements, such as pellets, so that they may conveniently be exposed to radiation simultaneously, at any one of a plurality of different angular orientations. A structure with such capabilities is highly desirable when a large number of pellets are to be subjected to radiation tests, such as X-ray tests, since the simultaneous exposure of several elements will result in decreased cost and time, required for such tests.

Accordingly, it is an object of the present invention to provide a new structure for supporting small elements exposable to radiation.

Another object is the provision of a simple structure capable of supporting a plurality of small elements, subjected to radiation, at any one of a plurality of desired angular orientations.

A further object is the provision of a structure for supporting simultaneously a plurality of elements, so that they may be exposed to X-ray radiation tests, thereby reducing the number of X-ray plates necessary to provide the desired results.

Still a further object of the present invention is to provide a relatively simple and inexpensive structure for supporting a plurality of pellets, exposable to X-ray radiation simultaneously, at any one of a plurality of angular orientations, to reduce the cost and the time required to conduct such tests.

These and other objects of the present invention are achieved by providing a support housing, consisting of a longitudinal tube in which pellets to be irradiated are securely placed. The housing is constructed of a material, permeable to the particular radiating energy to which the pellets are to be subjected. One end of the housing is supported in a structure frame through a circular opening therein, so that the housing can be rotated about its longitudinal axis. A crank-like member, which extends from

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the end of the housing, supported by the frame, is used to manually or automatically rotate the housing about its longitudinal axis, so that the pellets therein may assume any one of a plurality of selected angular relationships with respect to a source of radiating energy. Markings are provided about the opening in the frame so that the relative position of the crank with respect thereto indicates the relative rational position of the housing with respect to a reference position, thereby defining the angular orientation of the pellets in the housing with respect to the energy source.

The novel features that are considered characteristic of this invention are set forth with particularity in the appended claims. The invention will best be understood from the following description when read in connection with the accompanying drawings, in which:

FIGURE 1 is a front view of the support apparatus of the present invention; and

FIGURE 2 is an isometric view of the multipellet support apparatus of the invention.

Reference is now made to FIGURES 1 and 2 which are front and isometric views respectively, of the multipellet support apparatus of the invention. Therein is shown a housing 11 in the form of a longitudinal tube, having one open end 13 through which small elements, such as pellets 15, to be irradiated may be inserted into the interior opening 17 of the housing. After the pellets are placed within the housing, end 13 may be sealed by a plug 19 to secure the pellets held within the housing.

The housing is made of a material, permeable to the particular radiating energy to which the pellets are to be subjected. For example, when the pellets are to be subjected to X-ray radiation, the housing may be made of material which is permeable to X-rays, such as nylon. For such application, the housing is placed between an X-ray source 21 and an X-ray sensitive surface, such as an X-ray plate 22. Thus, a single plate may be used to provide an X-ray negative of a plurality of pellets which are simultaneously exposed to X-ray radiation. Consequently, the number of plates and the time required for the X-ray analysis of the pellets is greatly reduced.

The housing 11 is preferably supported between the source 21 and plate 22 by means of a support frame 25, defining a circular opening 27. The opening is of a diameter large enough to enable a portion of the housing near its end opposite end 13 to be inserted therethrough. When properly supported by frame 25, the longitudinal axis of the housing 11 is aligned with the center of the opening 27. The housing 11, though securely held within the frame 25, is rotatable within the opening to any desired rotational position with respect to a reference position.

To control and facilitate the housing's rotation about its longitudinal axis, a crank-like member 29 is fastened to the housing's end, supported in the frame 25. The crank-like member 29, hereafter also referred to simply as crank 29, is exposed on one side of frame 25 while the housing 11, with the pellets therein, are exposed on an opposite side of the frame. The crank 29, shown extending in a perpendicular direction to the housing's longitudinal axis may be used as a pointed in conjunction with markings 25a, 25b, and 25c on frame 25, to indicate the rotational position of the housing with respect to a reference position, thereby defining the angular position of the pellets in the housing with respect to the energy source, such as source 21. Thus, the crank serves a double function, in that it is used to rotate the housing 11, as well as to provide an indication of the rotational position thereof.

From the foregoing, it should thus be appreciated that the novel support apparatus of the present invention pro-

vides means, whereby a plurality of pellets may be simultaneously supported to be exposed to radiating energy. Also, the apparatus includes a simple arrangement whereby the supported pellets may assume any one of a plurality of angular relationships with respect to the source, providing the radiating energy. Thus, proper pellet orientation is achieved. The crank 29 may be positioned with respect to the markings, either manually or by automatic means. One example of automatic means is a stepping motor (not shown) coupled to crank 29. By providing the motor with an appropriate number of pulses, crank 29 may be automatically turned to align itself with the desired marking, indicative of a particular angular orientation of the pellets with respect to the radiating energy source.

There has accordingly been shown and described herein in a multipellet support apparatus, useful in supporting a plurality of pellets to be exposed to radiating energy. It is appreciated that those familiar with the art may make modifications and/or substitute equivalents in the arrangements as shown. Therefore, all such modifications and/or equivalents are deemed to fall within the scope of the invention as claimed in the appended claims.

What is claimed is:

1. An apparatus for supporting a plurality of small specimens to be subjected simultaneously to energy, radiating from a radiating energy source, towards an energy sensitive element comprising:

a single tubular housing disposed between said source and said element in the path of said radiating energy, the housing being of a material permeable to said radiating energy having at least one open end and defining an opening along its longitudinal axis extending from said open end, said opening being large enough to support the specimens therein at different axial positions, the longitudinal axis of said housing being substantially perpendicular to the shortest path of energy from said source to said element;

a support frame defining a circular opening for rotatably supporting an end of said housing opposite said open end in the circular opening thereof; and operable means coupled to the housing end supported by said frame for controlling the rotation of said housing about its longitudinal axis to control the angular orientations of said specimens with respect to the source of radiating energy thereby to simultaneously control the orientations of said specimens in the path of the energy radiating from said source toward said energy sensitive element.

2. The apparatus defined in claim 1 further including a plurality of markings, radially disposed about the center of the opening in said support frame, the relative position of said operable means with respect to said markings being indicative of a rotational position of said housing about its longitudinal axis with respect to a reference position.

3. The apparatus defined in claim 2 wherein said operable means comprises a manually rotatable crank-like member integrally connected to the end of said housing supported by said frame, said crank-like member having a portion thereof extending in a direction perpendicular to the longitudinal axis of said housing to form a pointer in relation to said markings whereby the position of said pointer adjacent each of said markings is indicative of another rotational position of said housing with respect to said reference position.

4. An apparatus for supporting simultaneously a

plurality of pellet-sized elements between an X-ray source and an X-ray sensitive surface to simultaneously expose said elements to X-ray radiation, directed from said source to said surface comprising:

5 a single tubular housing of material permeable to X-ray radiation, said housing having one open end and defining an opening extending from said open end along the longitudinal axis thereof said opening being large enough to support said pellet-size elements therein at different axial positions;

10 a support frame defining an opening for supporting said tubular housing between said X-ray source and the X-ray sensitive surface by supporting an end of said tubular housing opposite said open end in the opening thereof with the longitudinal axis of said housing, substantially perpendicular to the shortest path between said source and said sensitive surface; and

15 operable means coupled to said housing end supported in said frame for controlling the rotation of said housing about its longitudinal axis to control the angular orientations of said elements with respect to said X-ray source, thereby to simultaneously control the orientations of said pellet-sized elements in the path of the X-ray radiation from said source to said sensitive surface.

20 25 30 35 40 45 50 55 5. The apparatus defined in claim 4 wherein the opening in said frame is circular and said housing comprises a nylon tube having an outer diameter not greater than the diameter of the circular opening in said frame, whereby the end of the tube supported in the frame opening is rotatable therein with the longitudinal axis of said tube being aligned with the center of said circular opening, and the inner diameter of said tube is related to the largest diameter of any of said pellet-sized elements, with each element located at a different axial position in said tube.

6. The apparatus defined in claim 5 further including a plurality of markings radially disposed about the center of the opening in said support frame, the relative position of said operable means with respect to said markings being indicative of a rotational position of said housing about its longitudinal axis with respect to a reference position.

7. The apparatus defined in claim 6 wherein said operable means comprises a manually rotatable crank-like member integrally connected to the end of said housing supported by said frame, said crank-line member having a portion thereof extending in a direction perpendicular to the longitudinal axis of said housing to form a pointer in relation to said markings whereby the position of said pointer adjacent each of said markings is indicative of another rotational position of said housing with respect to said reference position.

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65 U.S. Cl. X.R.

250—49.5